

III. REMARKS

Preliminary Remarks

Upon entry of this Amendment, claims 1 to 17 will be pending. Claims 1, 3, 4 and 6 are amended; claims 7 to 17 are new. Support for the claim amendments and the new claims can be found in the specification as filed (see, for example, paragraphs [0020] to [0026] and paragraphs [0035] to [0038]).

Paragraph [0003] of the specification is amended merely to list the Japanese application and the U.S. patent corresponding to JP 2,898,437. The applicants believe that no new matter is added by the amendments to the claims, the new claims, and the amendments to the specification.

This response is filed along with a Request for Continued Examination (RCE), a first PTO-2038 form for the RCE fee under 37 C.F.R. §1.17(e), a Petition for an Extension of Time of one month, and a second PTO-2038 form for the extension of time fee under 37 C.F.R. §1.17(a)(1). The applicants respectfully request reconsideration and allowance of the present application.

Election By Original Presentation –

The examiner states that claims 1 to 5 are directed to an invention that is independent or distinct from the invention originally claimed because compositions using molten metal are deemed patentably distinct from the foamable powders originally presented and to the extent that carbonate would exist in combination with molten metal, the carbonates would be in substantially a different form than the carbonates as foamable powders set forth in the claims as originally presented.

While the applicants acknowledge that the originally claimed foaming agent for manufacturing a foamed or porous metal is similar to a foaming agent that is mixed with molten metal as claimed, the applicants respectfully submit the claims as amended herein recite a condition wherein the foaming agent has started performing, or has already performed, a foaming reaction (or become gasified), for example, from the heat of the molten metal. Therefore, the applicants respectfully submit that the combination

Specification –

The examiner objected to the specification because he states that the applicants have not provided the reference JP 2,898,437 in an Information Disclosure Statement (IDS) and his search of Derwent Abstracts and the JPO databases failed to provide a published reference corresponding to this citation.

First, for the convenience of the examiner, the applicants enclose herein a patent family tree from the European Patent Office (EPO) database showing: (1) the applicants have provided the correct reference (JP 2,898,437), and (2) the relationship between JP 2,898,437 (the issued patent), JP 4,231,403 A (the corresponding application), and U.S. Pat. No. 5,151,246 (the corresponding U.S. patent). Second, the applicants respectfully note that not only did the applicants submit U.S. Pat. No. 5,151,246 in the IDS dated June 20, 2005, but also that the electronic Image File Wrapper of the present application on the U.S. Patent and Trademark Office's website contains an electronic version of JP 2,898,437. Therefore, the applicants respectfully request withdrawal of this objection.

Patentability Remarks

Rejection under 35 U.S.C. §102(b) –

Claim 6 was rejected under 35 U.S.C. §102(b) as being anticipated by Hähn *et al.* (U.S. Pat. No. 5,401,568). The applicants respectfully traverse in view of the preceding amendments and succeeding remarks.

The examiner's position is that Hähn *et al.* disclose calcium carbonate or magnesium carbonate particles coated with silica, *i.e.*, SiO₂. The examiner considers this feature of the material as a foaming agent to be inherent in Hahn *et al.* because the powders are otherwise indistinct from the claims and carbonates are well known to decompose at elevated temperatures to form carbon dioxide gas.

As amended, claim 6 is directed to a method of manufacturing a foamed or porous metal, the method comprising preparing a foamable powder having a coating layer of SiO₂ covering particle surfaces of the foamable powder; adding the foamable powder as a foaming agent into a molten metal, wherein heat from the molten metal

layer of SiO₂ covering particle surfaces of the foamable powder; adding the foamable powder as a foaming agent into a molten metal, wherein heat from the molten metal gasifies the foamable powder; and cooling the molten metal to yield the foamed or porous metal, wherein the foamed or porous metal includes a plurality of pores formed from gasification of the particles of the foamable powder.

While it is *possible* to use the product of Hähn *et al.*, *i.e.*, a particle composition consisting of fine-grained white pigment of MgCO₃ wrapped with a layer of amorphous precipitated silicic acid, as a foaming agent, the applicants note that due to its small specific surface, this product would not create the sufficient foaming reaction as is accomplished by the present invention. More specifically, Hähn *et al.* require a small specific surface of generally <100 m²/g, whereas it is desirable for foaming agents to have a large specific surface for the purpose of creating a foaming reaction with high foaming efficiencies. As a result of these opposing requirements, the applicants respectfully submit that the product of Hähn *et al.* cannot practically be used as a foaming agent.

The present invention provides a foaming agent having a good wetting property with molten metal, such as aluminum, so as to ensure uniform distribution of the forming agent into the molten metal, which leads to the production of a foamed or porous metal with uniformly distributed pores, and which is formed from a foamable powder that does not contain any hydrogen radicals, which would otherwise involve the danger of a hydrogen induced explosion. To this end, the inventive foaming agent includes a coating layer of SiO₂ covering the particle surfaces of a foamable powder so as to provide a good wetting property with a molten metal, and the foamable powder being a carbonate, such as CaCO₃ and MgCO₃.

In contrast, Hähn *et al.* are directed to a particulate composition or material to be used as a filling material in a heat-sensitive layer of a heat-sensitive recording material. The particulate composition is used to prevent the adhesion of a molten dye-develop complex to a thermal print head (column 1, lines 25 to 30). To this end, the particulate composition needs to have a high oil absorption rate of generally >100ml/10g, a high particle fineness with a mean secondary particle size of generally at least 70wt% < 4

µm, a surface activity as small as possible, and a small specific surface of generally <100 m²/g (column 1, lines 31 to 43). To attain such requirements, the particulate composition of Hähn *et al.* includes fine-grained white pigments and an amorphous precipitated silicic acid that are bound together either by wrapping the fine-grained white pigments with a layer of amorphous precipitated silicic (claim 1) or through punctiform bonding (claim 14).

The applicants respectfully submit that given the underlying objective, functions and effects achieved by the structural components of the final product, Hähn *et al.* do not anticipate claim 6. Therefore, the applicants respectfully request withdrawal of this rejection. Furthermore, Hähn *et al.* also do not anticipate claims 1 to 5 and 7 to 17.


IV. CONCLUSION

In view of the amendments and remarks above, the applicants respectfully submit that this application is in condition for allowance and request favorable action thereon.

In the event this response is not timely filed, the applicants hereby petition for an appropriate extension of time. The fee for this extension, along with any other additional fees which may be required with respect to this response, may be charged to Deposit Account No. 01-2300, referencing Attorney Docket No. 101154-00014.

Respectfully submitted,

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Family list

13 family members for:

JP4231403

Derived from 9 applications.

- 1 **VERFAHREN ZUR HERSTELLUNG AUFSCHÄUMBARER METALLKÖRPER**
Publication info: **AT142135T T** - 1996-09-15
- 2 **METHODS FOR MANUFACTURING FOAMABLE METAL BODIES**
Publication info: **CA2044120 A1** - 1991-12-09
CA2044120 C - 2001-05-01
- 3 **Porous metal body prodn. - involves compaction at low temp. followed by heating to near melting point of metal**
Publication info: **DE4018360 C1** - 1991-05-29
- 4 **METHODS FOR MANUFACTURING FOAMABLE METAL BODIES**
Publication info: **DE4101630 A1** - 1991-12-12
DE4101630 C2 - 1992-04-16
- 5 **Foamable metal body prodn. with reduced density differences - by charging hollow section with mixt. of powder contg. expanding agent and metal powder, and precompacting**
Publication info: **DE4124591 C1** - 1993-02-11
- 6 **Verfahren zur Herstellung aufschäumbarer Metallkörper**
Publication info: **DE59108133D D1** - 1996-10-10
- 7 **Process for making foamed metal bodies**
Publication info: **EP0460392 A1** - 1991-12-11
EP0460392 B1 - 1996-09-04
- 8 **PREPARATION OF FOAMABLE METAL BODY**
Publication info: **JP2898437B2 B2** - 1999-06-02
JP4231403 A - 1992-08-20
- 9 **METHODS FOR MANUFACTURING FOAMABLE METAL BODIES**
Publication info: **US5151246 A** - 1992-09-29

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